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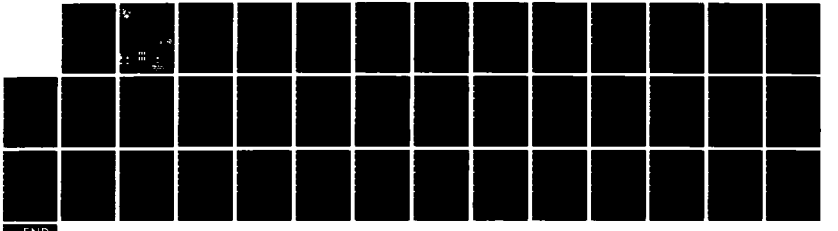

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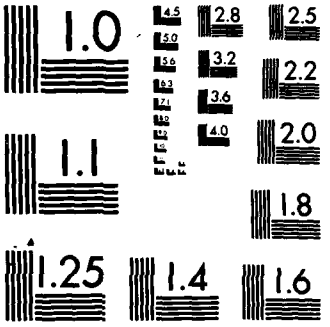

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AIR WAR COLLEGE

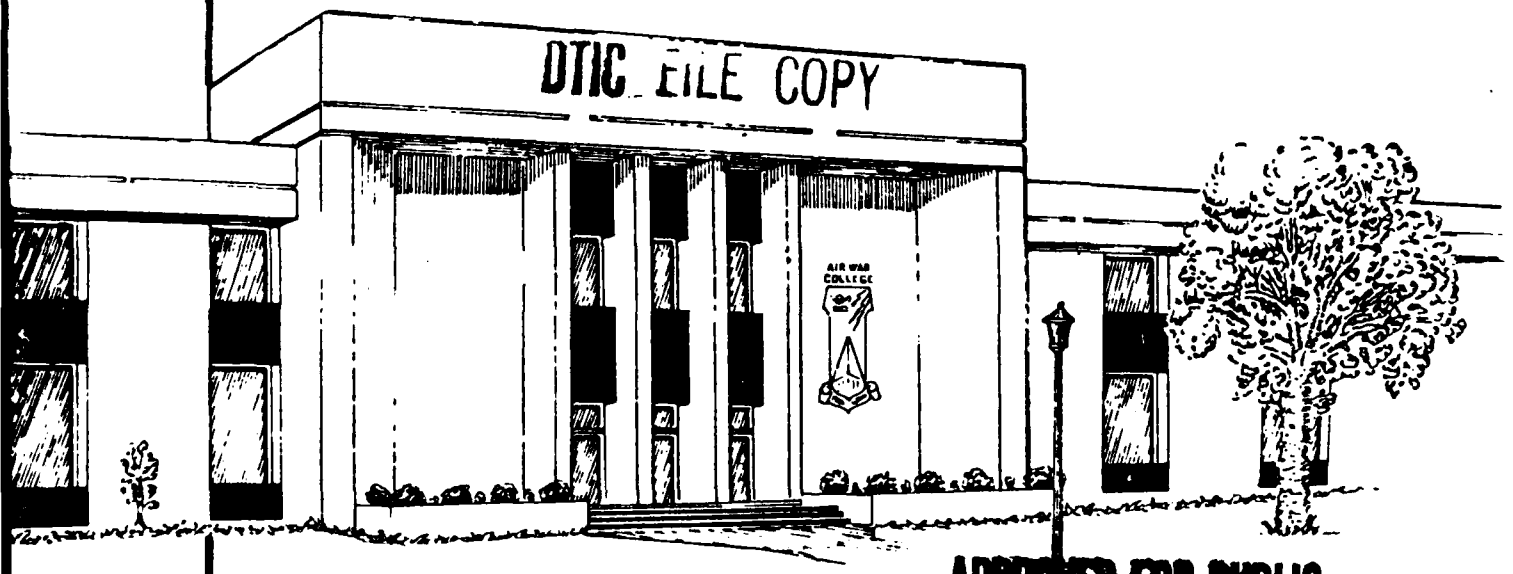
RESEARCH REPORT

No. AU-AWC-85-171

DEPARTMENT OF DEFENSE INFLUENCE ON

INDUSTRIAL PRODUCTIVITY

By COLONEL ROBERT J. PRATT



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SECURITY CLASSIFICATION OF THIS PAGE AD-A159267

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) AU-AWC-85-171	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION Air War College 6b. OFFICE SYMBOL (If applicable) DFR	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State and ZIP Code) Maxwell AFB, AL 36112-5522	7b. ADDRESS (City, State and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State and ZIP Code)	10. SOURCE OF FUNDING NOS. PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT NO.
11. TITLE (Include Security Classification) Department of Defense Influence on Industrial Productivity	
12. PERSONAL AUTHOR(S) Col Robert J. Pratt	
13a. TYPE OF REPORT Research 13b. TIME COVERED FROM _____ TO _____	14. DATE OF REPORT (Yr., Mo., Day) May 1985 15. PAGE COUNT 29
16. SUPPLEMENTARY NOTATION	

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB. GR.	

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Introductory comments regarding the impact of lagging productivity in the defense industrial sector set the stage for an examination of the productivity problem and as assessment of the DOD role in improving it. A definition of productivity follows with an examination of the productivity environment over the last decade rounding out the background discussion. An in-depth analysis highlights the critical role played by Congress, DOD, and defense contractors themselves to combat the multifaceted productivity problem. The author's insider perspective highlights the complexity of the productivity issues and reports on positive progress being made. Reorientation of our monetary and fiscal policies, increased consistency in public regulatory policy to incentivize innovation through research and development, and industrial management leadership to resolve operational barriers to productivity growth are offered as three elements of a blueprint for improving productivity in the long term.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS ☒	21. ABSTRACT SECURITY CLASSIFICATION Unclassified
22a. NAME OF RESPONSIBLE INDIVIDUAL Dr. Robert Bogard	22b. TELEPHONE NUMBER (Include Area Code) (205) 293-7074 22c. OFFICE SYMBOL AWC/DFR

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AIR WAR COLLEGE
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DEPARTMENT OF DEFENSE INFLUENCE ON INDUSTRIAL PRODUCTIVITY

by

Robert J. Pratt
Colonel, USAF

A RESEARCH REPORT SUBMITTED TO THE FACULTY

IN

FULFILLMENT OF THE RESEARCH

REQUIREMENT

Research Advisor: Lt. Col. Richard D. Clark

MAXWELL AIR FORCE BASE, ALABAMA

May 1985

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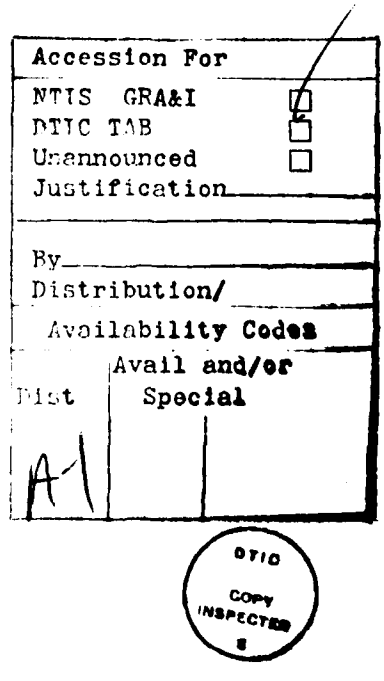

AIR WAR COLLEGE RESEARCH REPORT ABSTRACT

TITLE: Department of Defense Influence on Industrial Productivity

AUTHOR: Robert J. Pratt, Colonel, USAF

Introductory comments regarding the impact of lagging productivity in the defense industrial sector set the stage for an examination of the productivity problem and an assessment of the DOD role in improving it. A definition of productivity follows with an examination of the productivity environment over the last decade rounding out the background discussion. An in-depth analysis highlights the critical role played by Congress, DOD, and defense contractors themselves to combat the multi-faceted productivity problem. The author's insider perspective highlights the complexity of the productivity issues and reports on positive progress being made. Reorientation of our monetary and fiscal policies, increased consistency in public regulatory policy to incentivize innovation through research and development and industrial management leadership to resolve operational barriers to productivity growth are offered as three elements of a blueprint for improving productivity in the long-term.

BIOGRAPHICAL SKETCH

Colonel Robert J. Pratt (M.S., Procurement Management, School of Systems and Logistics, AFIT) is a certified professional contracts manager with over twenty year's experience in contracting and manufacturing. He served three separate tours in major defense contractor facilities representing the Air Force. His most recent assignment was Commander of the Air Force Plant Representative Office, Rockwell International, North American Aircraft Operations, Columbus, Ohio on the B-1B program. He is a graduate of the Defense Systems Management College where his paper, "Partitioning of Military Specifications and Standards," received the Commandant's Award for excellence. Colonel Pratt is a graduate of Squadron Officers School, Air Command and Staff College, and the Air War College, class of 1985.

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CHAPTER I

INTRODUCTION

Despite considerable attention from the highest levels within the Department of Defense (DOD) over the last decade, lagging productivity in the defense related industrial sector remains a major factor in continued weapon systems growth. The need to increase national productivity has justifiably been proclaimed by the experts as the challenge of the 80's. Our awareness of an impending "productivity crisis" is heightened each time we read inflation, unemployment, and balance of trade statistics. In recent years we have witnessed the eclipse of the once dominant U.S. automotive, steel, and consumer electronics industries by their more productive foreign counterparts. Those industries where the U.S. still retains an edge--aerospace, semiconductors, and computers--have become the new targets of foreign competition.

Why is lagging productivity such a concern? Burton G. Malkiel, chairman of Princeton University's Department of Economics, believes that low productivity growth may be the single most important factor in determining our national economic well-being. (1:81) Without productivity growth real standards of living cannot increase, poverty cannot be reduced, and environmental quality cannot be improved. In a 1980 statement before the House Armed Services Committee on

certain capital assets as termination protection for contractors. Stringently controlled and minimally applied to only those acquisitions which require them as an affordability issue, these provisions contribute immeasurably to the productivity improvements being realized in many of our major DOD acquisition programs like the B-1B.

Changes in arms transfer policies at the federal level is a recent response to bolster lagging productivity. President Reagan's policy on arms transfer put into effect in 1981 includes as one of its basic tenets that arms sales to foreign nations can ". . .help enhance United States defense capabilities and efficiency." (7:33) Under Secretary for Security Assistance Science, and Technology, James L. Buckley testified that arms transfers can make ". . .a modest contribution to the needed upgrading of [the U.S.] defense manufacturing base." (7:37) This change of policy is a positive step forward and reenergizes activity not supported by the Carter administration.

Arms transfer policies have been a part of our history dating back to the reindustrialization and rearming of Germany and Japan following World War II. Provided for years through our Military Assistance Program (MAP), these transfers provided a significant outlet for defense production and helped sustain it through the 1950's and 60's. Particularly after Vietnam and the drawdown in military expenditures in the mid-late 70's, increased

for technology implementation by defense contractors through contractual incentives. The ultimate objective of all these programs is to stimulate defense contractor capital investment in new technology to achieve maximum productivity enhancement and reduced cost.

On April 30, 1981, then Deputy Secretary of Defense Frank Carlucci announced 31 acquisition initiatives to achieve enhanced readiness, reduce acquisition costs and streamline the acquisition process. Subsequently institutionalized as the DOD Acquisition Improvement Plan (AIP), these initiatives are directed, among other things, at increasing program stability by fully funding R&D and procurement, including multi-year funding, where appropriate, and encouraging capital investment to enhance productivity through legislative, contractual, and other economic incentives. These initiatives sent a strong message to defense industry regarding DOD leadership's concern for lagging productivity and cost.

Other government policies long considered disincentives to capital investment by industry, such as disallowance of cost of capital expenses and assumption of risk for acquisition of capital assets, have been modified through new legislation and DOD policies. The cost of capital committed to facilities is now a recognized and accepted cost. Special contractual provisions exist to transfer some of the risk associated with the acquisition of

copout by management for their own shortsightedness and lack of attention to productivity.

Department of Defense Initiatives

DOD policy plays a significant role in influencing defense industry productivity. Critics of DOD policy prior to the 80's point out there was no single coordinated defense policy to address motivation, capital investment, value engineering, and technology innovation to get them all working in one direction. The large number of disjointed programs tended to cause a manager in defense industry to be pulled in so many different directions he might, as a result, take no action or pursue one against our best wishes. In response to such criticism, DOD has undertaken a number of initiatives to alleviate lagging productivity in the defense industry. Some are new and others are aimed at providing new focus for existing programs.

Extending back to the 1950's, the Air Force has sponsored a Manufacturing Technology (MANTECH) program to help transfer advanced production technique from the R&D laboratory to the factory floor. In 1968 a tri-Service advisory group was formed to further disseminate technology innovations among the Services, industry, and other government agencies. The effort was further expanded by introduction of the Technology Modernization (Tech Mod) program and the Industrial Modernization Incentive Program (IMIP) to further increase the rate of capital investment

types of technological innovation, the net effect of the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), and the Occupational Safety and Health Adminstration (OSHA) regulations appeared to stifle the country's productive energy. Edward Denison of Brookings Institute suggests that such regulatory activity lowered productivity growth by one-third of 1 percent per year. (1:84) Although the precise impact of such regulations is incalculable, they unquestionably required redirection of company funds from those activities which directly contribute to productivity to those that do not. That is not to suggest that the intent of such regulations are incorrect, but rather than there are associated costs which more often detract from, than contribute to, productivity growth.

A final factor which falls outside the control of both management and government is the changing nature of the work force. The composition of today's labor force includes many young and untried workers with less experience and training. The work force, and particularly managers, have become much more mobile, decreasing to a large degree that all important ingredient to productivity--identity with the product and the company. Some critics point out that there has been a change in the work ethic and the American worker just doesn't want to work anymore. Others claim that such is not the case, and that comments about work ethic are a

long-term and relatively ambitious. Free wheeling, generally scoped R&D converted into controlled, product related efforts. With the change in R&D emphasis came a loss in the technology edge enjoyed by U.S. industry for so long. There also came a loss in the ability of U.S. industry to compete in the international marketplace. Industry fell behind in developing new products and processes for making things better and cheaper. Foreign competitors, on the other hand, did the exact opposite.

Another causal factor frequently blamed for lagging productivity is the increase in the cost of energy, although the extent of impact seems to be a question. Without question, energy prices rose significantly in the 70's, but relative to everything else, they rose by only 9 percent. (5:2) More signficant perhaps than the realized increases in energy prices was the dampening effect on investment and innovation caused by uncertainty over future energy prices and energy policy. The impact of energy on inflation and the national preoccupation with solving the energy shortage most certainly magnified the problem.

Perhaps the most commonly voiced factor for lagging productivity is governmental regulations. As the economy matured in the post-World II era, interest turned to things other than growth. During the 70's, government interest focused particularly on environmental concerns, health, and welfare. Although regulatory activity can stimulate certain

knowledge of the product and production were downgraded as no longer essential.

A fifth factor could be called an accident of history. Combining the four previous factors together with the unprecedented good times in the U.S. since World War II, there was hardly any way American industry could fail. Everything they did seemed to work. Almost anything produced could be sold, if not at home, then certainly overseas. Short term concerns with profit maximization hid the productivity slide from managers. Research & Development received too little focus. Serving existing markets instead of looking for, or creating new ones became the general practice.

Tregoe placed a great deal of the blame for lagging U.S. productivity squarely on the shoulders of management. Although poor management practices over the last 30 years was a major factor, there were other causal factors outside management's control which also contributed.

High inflation rates, particularly during the 70's, are also identified as a major causal factor for declining productivity. To the extent that inflation reduces investment rates, it tends to discourage the sort of research and development that requires new plants and equipment for its utilization. As inflation makes long-run prediction of prices and circumstances increasingly hazardous, it tends to discourage the sorts of R&D that are

together for the good of the group. Loyalty, pride, and literally a lifetime of service to the same company contributed significantly to their high rate of productivity growth.

A second factor involves organization of the work. U.S. industry became enamored with the scientific management principles of Frederick Taylor. Things were viewed from the viewpoint of the industrial engineer. Work became dehumanized, again, highly specialized. The result was the development of labor unions and creation of an adversarial relationship between management and workers.

A third factor relates to a growing fascination by management over the last 30 years with short term profit maximization. Organizational and managerial success or failure began to be judged in short term profits. Long term interests in capital improvements, research and development, and quality were sacrificed. People became an expendable part of the equation.

A fourth factor is the emergence of the business computer. The proliferation of computers and the overwhelming, instantaneous availability of data enslaved management to the analytical task of figuring out what was going on in literally every imaginable corner of their companies. Technically competent lawyers and financial analysts found their way into key executive positions because of their data analysis capability. Intimate

CHAPTER III

ANALYSIS OF THE PROBLEM

Factors influencing productivity

A number of factors have considerable influence over lagging productivity in the defense related industrial sector. The difficulty comes in trying to single out one or a group of factors as the culprit. Many economists claim that they can tell us precisely, but they cannot and probably for good reason. As George Bernard Shaw once said, "If you laid all the economists in the world end to end, they still would not reach a conclusion." (1:84) In spite of their best efforts, the relative importance of various responsible factors remains a mystery. The problem is multi-faceted, and no one single action can be taken to restore it.

Benjamin B. Tregoe, Chairman of Kepner-Tregoe, Inc., and an organizational development expert, cites five causal factors to explain declining U.S. productivity and the success of foreign competitors, particularly Japan. (3:24-5)

The first factor comes from a comparison of the cultural differences between the U.S. and Japan. Over the last 30 years U.S. industry focused largely on individualism, specialization, taking care of #1. To a large extent this pychosis destroyed the idea of teamwork and cooperation. The Japanese, on the other hand, worked

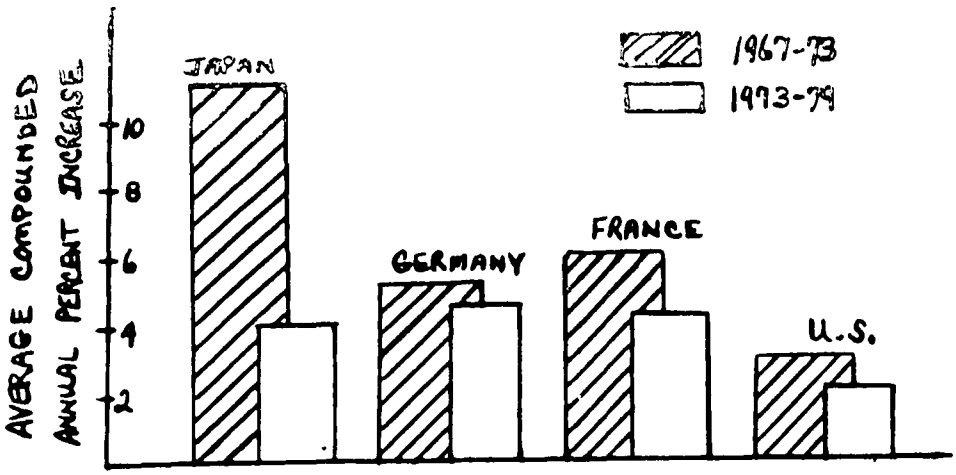

Figure 1. How U.S. Productivity Lags in Manufacturing

The early 1980's began a reexamination of the American economy. Beset by very high rates of inflation, high rates of unemployment, deficits in our balance of trade, basic structural problems in major industries like steel and automobiles, and very low rates of productivity increase, the U.S. economy, long the engine on which our people, and those of other countries as well, could count for progress, was in deep trouble. Congress, DOD, and most fortunately many sectors of industry initiated priority action to reverse the alarming trend, and put America back on its feet.

U.S. Productivity Environment

To place this analysis in its appropriate context, it is useful to evaluate the productivity environment within the United States over the last several years. During the 1950's and 60's, the U.S. enjoyed a relatively high productivity growth rate. During this period, the Consumer Price Index (CPI) increased only 2 percent per year for all goods and services. Companies were investing in new and better plants and equipment, and our standard of living was constantly rising. During the late 60's and early 70's, the CPI increased significantly and productivity growth started to decline. (2:4) We began to experience a slowdown of investment in new technology and modern equipment. Americans began to take our productive sector, which generates a large portion of our national's wealth, for granted. We began to build on a service oriented economy base which contributes little to the nation's strength.

During the same period, lesser developed industrialized nations, most notably Japan, West Germany, and France, began to combine high technology with cheaper labor to produce and sell everything from steel to high technology electronics and aircraft. As can be seen in Figure 1, U.S. productivity lagged considerably behind the productivity growth of the foreign competition. Most alarming was the continuing marked decline in U.S. productivity over the period indicated.

Productivity is not a measure of efficiency of production, nor is it an indicator of how hard the work force works. Industrial engineering techniques, such as work measurement and performance standards applications are used to indicate work force efficiency. Productivity, on the other hand, simply measures how effectively you use your resources.

As will be discussed in more detail subsequently, productivity is impacted by a number of factors. Such factors include production techniques, tools and equipment availability, workforce skill, managerial ability, scale of operations, material type and quantity, product mix, labor-management relations, and quality of the work environment. Productivity is also impacted by the cost of energy, government regulations, technology, capital investment, and the number of employees relative to the available equipment. Productivity is not concerned about cost, timeliness, responsiveness or quality. It is only concerned with the fact that goods or services are produced.

Another distinction which needs to be made is the difference in productivity measurement between capital intensive industries or those that use more capital stock (tools and equipment) than labor, as typified by aerospace, and labor intensive industries. Capital intensive industries, such as will be referred to throughout the remainder of this paper, typically demonstrate a higher output per manhour than do labor intensive industries.

CHAPTER II

BACKGROUND

Definition of Productivity

Before initiating an analysis of the productivity problem, it is important to first define what is meant by the term productivity. Productivity is commonly expressed as a ratio between resources input to production and the value of goods produced. The greater the disparity between input and output, the greater the productivity. (3:24) Input this year should be less than last year, and output should be greater. The disparity between input and output is measured as a percentage.

Productivity is often evaluated as one of two types--labor and total factor. The most commonly used expression of productivity as reported by the Bureau of Labor Statistics (BLS), is output per manhour. (4:5) Although this expression is a narrow definition, it is easy to measure and useful as a general productivity indicator. Total factor productivity includes all the factors of production including labor, material resources, money, machinery, and personal and managerial skills. For purposes of this paper we will be referring principally to labor productivity and the factors which influence it.

An important distinction needs to be made regarding what the expression productivity measurement really means.

behind lagging productivity and those actions which both DOD and defense contractors have taken to alleviate it. I will then examine a proposed blueprint for the future for those actions to be followed to reestablish healthy productivity growth in the defense industry.

erosion of the defense industrial base, General Alton D. Slay, then Commander, Air Force Systems Command, clearly depicted the productivity problem as ". . .a national productivity disease which must be addressed if we are to maintain our status as the focus of the free world's industrial, economic, and military strength." (2:2) The strength of the defense industrial complex is its ability to cost effectively produce the means (equipment) to conduct war. Productivity is the heart of the issue of cost effectiveness.

Lagging U.S. productivity holds serious implications for defense and could result in a loss of technology leadership in certain fields. Low productivity growth has resulted in a decrease in the size and capability of the U.S. industrial base in terms of technology, age, and number of facilities pointing toward higher acquisition and operating costs for the Department of Defense (DOD). As General Slay pointed out in his testimony, ". . .it is a gross contradiction to think that we can maintain our position as a first-rate military power with a second-rate industrial base." (2:2)

This paper will examine the productivity problem and attempt to assess the role of DOD in improving it. After a brief review of what is meant by productivity, and an examination of the productivity environment in the United States over the last decade, I will focus on the factors

restrictions were imposed on military assistance programs. These restrictions contributed to the growth of idle capacity and reduction in defense industry capitalization for expansion.

Defense Contractor Initiatives

The solution to lagging productivity does not lie solely with DOD or the Executive Branch of government because it is only one side of the problem. To fully understand the extent to which the productivity problem has been addressed, it is appropriate to also examine the actions undertaken by defense contractors.

Solutions for lagging productivity abound within the defense industrial sector. Flexitime, productivity czars, jobsharing, Japanese management, participative management, work-at-home programs, office and factory automation outplacement, and suggestion programs are all present. Changes are occurring on the factory floor ranging from quality circles, to the introduction of robotics and computer aided systems for logistics planning. Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) systems shorten the time from product conception to the marketplace. Virtually non-existent in 1978, approximately one-third of all design today, and a projected 80 percent of all design effort will be accomplished within the next five years through CAD systems. (8:E-4)

Major advances in office productivity are being accomplished through automation. Micro-computers and word processors are providing the means for gigantic leaps forward in productivity of the white collar workforce. Mini-computers provide information faster for more rapid decision making. The human element is also being afforded more attention. Management is demonstrating its sensitivity to the contribution that employee health and better treatment of workers makes to productivity growth.

Companies are beginning to recognize again the importance of research and development. Research & Development spending for 1983 was up 8.2 percent over 1982 levels, but has not yet fully recovered from the 1968-80 period when R&D as a percent of sales decreased by 33 percent. (9:63) The focus for R&D is not entirely on new products. Considerable effort is being expended for innovations to existing production processes. Although industry's solutions to lagging productivity have not entirely solved the problem, they are moving in the right direction.

An Insider's Viewpoint

As an observer and participant in the defense contracting environment for the last 20 years, I have been able to personally evaluate the impact of lagging defense industry productivity on weapon systems cost. As I observed, I became convinced of the difficulty in solving

the complex and interdependant causes of declining productivity. I became equally convinced, however, of the critical urgency to reverse the trend to strengthen the defense industrial base and reduce weapon systems cost.

In my opinion, DOD initiatives to combat lagging productivity have met with mixed success. Bureaucratic red tape, lack of a centralized control point, and underfunding are three principal reasons for the slow rate of progress. In spite of such shortcomings, DOD initiatives have contributed to a growing sensitivity and willingness by industry to look for ways to implement productivity enhancing technology on the factory floor. More companies are beginning to share their technology improvements. Some are using their technologies as marketable commodities for profit through helping an interested client. Frequently, the client will adopt the technology, improve upon it, and push the developer competitively to achieve even greater technology improvements.

A salient fact to remember about DOD initiatives is that they can only indirectly affect industrial productivity. The complex interdependence of all the regulations and controls involved in the acquisition process frequently act more as disincentives to industry. A lack of such initiatives would be more dysfunctional to the process, however, by signaling a lack of concern.

My most recent experience working with a leading aerospace company on a critical Air Force strategic program demonstrated the positive progress being made jointly to improve lagging defense industry productivity. Unlike other front line, visible programs I have been connected with, cost, quality, and productivity were the constant focus of attention. Open dialogue existed on all issues between the Air Force and contractors to maintain the ahead of schedule, below cost status. This same attitude permeated the lowest levels of the Air Force and contractor organizations. Considerable capital investment was being expended by the Air Force and industry to maximize technological improvements and lower cost. But this program is just one of a number of highly successful programs currently underway.

A recent Air Force and defense industry study to provide an integrated analysis of the U.S. aerospace industrial base also pointed out several encouraging signs about lagging productivity. Using a productivity indicator of shipments per employee, this study indicated an average growth rate of 5.9 percent between 1982 and 1984. Annualized, the data indicates a productivity increase trend of 5.8 percent annually. Forecasting for 1985 indicated productivity enhancement goals of from 5 to 7 percent. (8:2-77) Current economic data provided by Bureau of Labor Statistics indicates the U.S. has shown the most dramatic

recovery from recessionary trends which prevailed throughout 1982. Manufacturing output increased strongly and at an accelerated pace in each of the first three quarters of 1983, which is the most current full year for which data is available. (10:52)

It appears that aerospace and other sectors of defense related industry are currently in a transition phase in which new technologies and automation are changing the character of the product and traditional manufacturing techniques. The private sector is doing more about lagging productivity, both in response to, and in spite, of DOD's initiatives to provide meaningful incentives.

CHAPTER IV

BLUEPRINT FOR THE FUTURE

Blueprint To Be Followed

Given the extent of actions taken by industry and DOD to overcome the problem of lagging productivity, what blueprint should be followed in the future to reestablish long term productivity growth in the defense industry? A number of financial motivators can be provided to industry to spurn capital improvement, but technology alone does not assure success. Technology plus people using and supporting it fully gives an organization a competitive edge on productivity and cost. Although certain factors, such as the changing demographics of the work force discussed earlier, are unavoidable, many of the important impediments to productivity are amenable to change and should be elements of a blueprint for reestablishing long-term productivity growth.

One area for focus is solving of operational problems in an organization. Solving operational problems removes barriers to effective production, reduces work time, improves quality, reduces cost, and improves productivity and profitability. Operational problems can be solved through active involvement of operators on the production floor or in the office. People feel better and demonstrate a commitment to the organization when they are involved in

such a participative way. One only needs to look to the Japanese for proof of the success of this type activity.

Benjamin Tregoe points out six conditions for success in resolving operational problems and improving productivity and quality in an organization. (3:41) The first involves a total, sincere commitment to improving quality by continuously spending time and money to improve operations. The second condition is providing all people from the top to the bottom of the organization with new problem solving skills. Such education should become an essential element of their initial and continuing educational training. The third condition involves providing an opportunity for problems to be solved in the right climate. People need to know they are expected to solve problems individually or in groups. Time should be set aside to facilitate such problem solving. A fourth condition is management providing the leadership in the use of problem solving techniques. Leaders should work with people and provide support for problem solving efforts. The fifth and sixth conditions involve rewarding successful problem solving, and continuing management leadership and support for the program of quality and productivity improvement over the long haul. Contractors should be motivated through the DOD source selection process to develop an operational problem solving climate for improving productivity.

Motivators For Defense Industry

There are also a number of financial motivators to induce defense industry to improve productivity in our blueprint for long term growth. Some of these motivators include expected net return, availability of funding, cost of money, operating cost trends, elasticity of prices, production capacity, demand, and competition. The key to addressing these motivating factors is Congress. Only Congress can provide the legislation required to respond to defense contractor requests for financial motivation, such as program funding stability through multi-year appropriations, or improved investment tax credits, and rapid depreciation allowances. Although considerable economic policy reform has occurred since 1981, considerably more is required in our blueprint for the future to encourage long-range capital investment and increased research and development.

In our blueprint for the future, DOD and Congress should remove other disincentives to defense contracting through relaxation of regulations and controls, particularly in the social and environmental areas. Future standards or controls should be viewed in terms of a cost-benefit analysis--comparing, for example, the social benefit with the social costs, including any adverse impact on innovation. Compliance or corrective action by industry in response to several well-intended environmental regulations

is frequently disproportionally costly considering the original intent of the enabling legislation.

Defense Industry Self-Initiatives

Our blueprint for reestablishing long-term productivity growth also calls for industry to move forward on its own initiative in several areas. Benjamin Tregoe postulates that five years of concerted effort by management can turn around and eradicate 30 years of productivity decline through two simple means. (3:26) The first involves annually reducing the input necessary to accomplish a given result by better management of available resources. The second involves reducing operational problems as referred to earlier. Industry should provide the leadership commitment to quality and improved production processes from a long term, rather than short term, profitability viewpoint. Management must demonstrate improved concerns for people and sensitivity to critically important workforce productivity. Here again, although much has been accomplished over the last few years, considerably more can be achieved.

CHAPTER V

CONCLUSIONS

Lagging productivity in the defense industry remains as a critical factor in weapon systems cost growth. Although certain factors adversely affecting productivity are unavoidable, and, in some cases, politically difficult to change, most of the important impediments pointed out in this report are amenable to change.

As pointed out in our blueprint for productivity growth, additional farsighted Government and Congressional initiatives are needed to reorient our monetary and fiscal policies. DOD programs and policy initiatives to stimulate productivity gains by incentivizing technological innovation by industry have had mixed success. Their rate of progress has been slow, and, at best, they can only indirectly affect industrial productivity. The dysfunctional effect of no DOD initiatives would be unacceptable.

Other blueprint elements should include increased consistency in public regulatory policy to remove costly disincentives to innovation. Another blueprint element should be industry leadership showing the way to solving operational problems to remove barriers to full productivity.

The solution is not simple, or immediate, but there are many encouraging signs. Although far from a "ground

swell" of support, productivity awareness is growing. It is once again acceptable, even preferable, to "do it right the first time," and improve the way something is done. The fact remains, however, that the productivity turnaround has only just begun. Much remains to be accomplished to bend the cost curve sufficiently for affordable weapon systems in the future.

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GLOSSARY

AIP	Acquisition Improvement Plan
B-1B	Newest United States Air Force Strategic Bomber
BLS	Bureau of Labor Statistics
CAD	Computer Aided Design
CAM	Computer Aided Manufacturing
DOD	Department of Defense
EPA	Environmental Protection Agency
FDA	Food and Drug Administration
IMIP	Individual Modernization Incentive Program
MANTECH	Manufacturing Technology Program
MAP	Military Assistance Program
OSHA	Occupational Safety and Health Administration
R&D	Research and Development
TECH MOD	Technology Modernization Program

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